

# PATENT ABSTRACTS OF JAPAN

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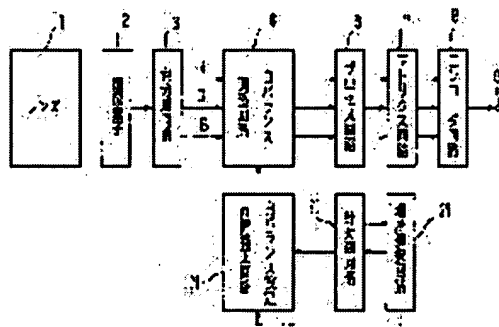
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(54) VIDEO CAMERA

(57)Abstract:

PURPOSE: To photograph with a color tone near to human visual sense even during an overseas tone by providing a means which corrects the white balance setting position of a white balance adjusting circuit closer to the human visual sense.

CONSTITUTION: A location selection circuit 27 by which the country location in the world can be set, and a time clock circuit 20 which generates the time information for the selected location by a control signal outputted from the location selection circuit 27 are equipped with a white balance setting position correction circuit 21 which corrects the setting position of white balance of the white balance adjusting circuit, i.e., color temperature corresponding to the time information obtained from the time clock circuit 20. The location (abroad) is selected and set, and correction data for the color temperature of photographed natural light set at every selected location can be obtained, and the white balance setting position of the white balance adjusting



circuit 16 can be corrected so as to approach the visual sense of the photographed natural light based on the correction data.

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3. In the drawings, any words are not translated.

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**CLAIMS**

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[Claim(s)]

[Claim 1] The video camera which carries out [ having had a white-balance adjustment device, a means obtain the amendment data corresponding to the color temperature of the natural light at the time of photography, a means amend so that a feeling of \*\* according the white-balance setting location of the above-mentioned white-balance adjustment device to the natural light at the time of photography may approach based on this amendment data, and the selection means that enable selection and a setup of the amendment data obtained from a means obtain the above-mentioned amendment data by the location (a foreign country), and ] as the description.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates especially to the white balance adjusting device of a video camera about a video camera.

[0002]

[Description of the Prior Art] JP,41-16011,Y can be mentioned as this kind of a thing. Drawing 5 is the block circuit diagram showing the white balance equalization circuit of the conventional video camera. In drawing in 1, a lens and 2 a color separation circuit and 4 for an image sensor and 3 The gain control circuit of R channels, 5 a process circuit and 7 for the gain control circuit of B channels, and 6 A matrix circuit, 8 an output terminal and 11 for an encoder circuit and 9 R sensor (optoelectric transducer which mainly has sensibility in red), In 12, B sensor (optoelectric transducer which mainly has sensibility blue), and 14 and 15 are division circuits, and G sensor (optoelectric transducer which mainly has sensibility green), and 13 constitute the white balance equalization circuit 16 from gain control circuits 4 and 5 and division circuits 14 and 15.

[0003] Next, actuation is explained. Photo electric conversion of the incident light image from a lens 1 is carried out by the image sensor 2, and color separation is carried out to three chrominance signals, R, G, and B, by the color separation circuit 3. The gain control circuit 4 controls the gain of R signal, and the gain control circuit 5 controls the gain of B signal, and adjusts the white balance of an image pick-up image. On the other hand, the R sensor 11, the G sensor 12, and the B sensor 13 are the output signals RS, GS, and BS proportional to R component of incident light, G component, and B component. It generates the ratio of G component and R component which does not depend for the division circuit 14 on the quantity of

light of incident light --  $GS/RS (=VR)$  -- outputting -- the division circuit 15 -- the ratio of B component and G component --  $BS/GS (=VB)$  is outputted. The gain control circuit 4 is control voltage VR. The gain becomes large as it becomes large, and the gain control circuit 5 is control voltage VB. When it is constituted by the control characteristic to which the gain becomes small as it becomes large, and it is the light source with few B components with many R components to the light source with a low color temperature, i.e., G component, it is control voltage VR and VB. A value turns into a low value compared with the case where a color temperature is high. Therefore, when the color temperature of the light source is low, the gain of the gain control circuit 4 of R channels is small, and the gain of the gain control circuit 5 of B channels becomes large.

[0004] Conversely, to the high light source, i.e., G component, of a color temperature, when R component is little-light source with many B components, the gain of the gain control circuit 4 of R channels becomes large, and the gain of the gain control circuit 5 of B channels becomes small. Thus, white balance is adjusted to change of R component contained in the light source, G component, and B component, i.e., a color temperature, by controlling automatically the gain of the gain control circuit 4 of R channels, and the gain of the gain control circuit 5 of B channels.

[0005]

[Problem(s) to be Solved by the Invention] Since the white balance equipment of the conventional video camera is constituted as mentioned above, even if the color temperature of the light source changes, it is always adjusted to fixed white balance. For this reason, even when redness cuts to human being's eye and white photographic subjects, such as evening glow, look clear to it, a photographic subject will be picturized white, for example. Moreover, there was time difference, also when using a video camera in sunshine, the location (foreign country) where the time of day of sunset is different, the same phenomenon happened and there was a problem of becoming an unnatural photography image.

[0006] This invention aims at obtaining the white balance equipment of the video camera which can perform white balance adjustment used as the more natural image pick-up drawing near [ even when there is time difference, of course and a photograph is taken in sunshine and the location (foreign country) where the time of day of sunset is different ] human being's visual sensation, when it is made in order to cancel the above troubles, and the color temperature of the light source changes.

[0007]

[Means for Solving the Problem] The white balance equipment concerning this invention is equipped with a means to choose and set up a location (foreign country), a means to obtain the amendment data corresponding to the color temperature of the natural light at the time of the photography set up for every selected location of that, and a means to amend the white balance setting location of a white balance adjustment device based on this amendment data so that the natural light at the time of photography may be approached at a feeling of \*\*.

[0008]

[Function] A means to set up the location (foreign country) in this invention The control signal for doubling at the time of day of the location, when the location of every country in the world can be chosen from the exterior, it chooses and it is set up, A means to output a select signal required in order to choose the amendment data table corresponding to the location and its time of day, and to obtain amendment data A means to output the amendment data corresponding to the color temperature of the natural light of the location memorized by the amendment data table chosen by the select signal, and to amend a white balance setting location based on the

amendment data, the color temperature of the natural light at the time of photography is approached in the white balance setting location of a white balance adjustment device (for example, at the time of evening (evening glow), white balance is shifted in the direction of red) - a setup of white balance is changed like.

5 [0009]

[Example] Example 1. drawing 1 is the block circuit diagram showing the configuration of this invention. In drawing, the location selection circuitry to which 27 can set the location of every country in the world, and the total time-of-day circuit 21 which generates the time information of the location chosen by the control signal by which 20 is outputted from the location selection circuitry 27 are white balance setting location amendment circuits which amend the setting location of the white balance of the white balance equalization circuit 16, i.e., a color temperature, according to the time information acquired from the total time-of-day circuit 20.

10 [0010] Drawing 2 is the block circuit diagram of the example which made the location selection circuitry 27 concrete. The information storage section, as for 31, information, such as a location of every country in the world and its time difference (criteria are Japan), is remembered to be, The counter for location selection which counts the contents in the information storage section 31 when 30 chooses a location from the exterior, The character generator with which 32 carries out the alphabetic character output (name of a country) of the information in the information storage section 31, A display output terminal for 33 to display the output of a character generator 32, A selection directions terminal for 28 to make the contents of the information storage section 31 count with the counter 30 for location selection, The selection decision terminal made to stop the counter 30 for location selection when 29 decides on a location, 34 using the present time of day from the total time-of-day circuit 20 outputted by the control signal from the information storage section 31, and the time difference information on the selected location obtained from the information storage section 31 It is the timer circuit which outputs the information for generating the present time of day (at the time - part) of \*\*\*\*\* which is not chosen with the selection decision terminal 29 from the total time-of-day circuit 20.

25 [0011] the block circuit diagram of the example which drawing 3 considered as the same configuration as the conventional example which showed the white balance equalization circuit 16 to drawing 5 , and made concrete the white balance setting location amendment circuit 21 (an interface with the location selection circuitry 27 is included) -- 22 -- the print-out of the total time-of-day circuit 20 -- and The correction value table which outputs the data which amend the setting location of white balance with the select signal from the location selection circuitry 27, the D/A converter which changes into an analog signal the amendment data with which 23 and 24 were outputted from the correction value table, and 25 -- output CR of D/A converter 23 output VR of the division circuit 14 the adder to add -- the same -- 26 -- output CB of D/A converter 24 Output VB of the division circuit 15 It is the adder to add. The output VRT of an adder 25 is inputted into the gain control circuit 4, and the output VBT of an adder 5 is inputted into the gain control circuit 5 as a gain control signal, respectively.

30 40 [0012] Next, actuation is explained. First, a location at present is explained as Japan. A photography person sets up with the selection decision terminal 29 in search of Japan, carrying out count actuation of the counter 30 for location selection with the selection directions terminal 28 of the location selection circuitry 27 first, and looking at a display output 33. From the information storage section 31, information of Japan, i.e., the control signal for carrying out a time-of-day setup and the time difference information (since it is Japan, criteria are 0 in this case) on a timer circuit 34, and the select signal to a correction value table are then outputted (in

order to choose a Japanese amendment data table). A setup of time of day makes the present time of day input into a timer circuit 34 from the total time-of-day circuit 20 with the control signal from the information storage section 31, is calculated for the time difference information from the information storage section 31 (for example,  $6:30 - 0 = 6:30$ ), and is generated from the total time-of-day circuit 20 as time information.

[0013] The correction value table 22 outputs white balance setting location amendment data according to the select signal from time information and the information storage section 31 inputted from the total time-of-day circuit 20, and the amendment data is the amendment signals CR and CB of an analog by D/A converters 23 and 24. It is changed. These amendment signals CR and CB For example, as shown in drawing 4 (a), the level of every morning and evening is high, and according to time of day, it changes so that level in the daytime may become low. Adders 25 and 26 are these amendment signals CR and CB. It adds to control voltage VR and VB (output of the division circuits 14 and 15), respectively. These amendment signals CR and CB The added control voltage VRT and VBT is inputted into the gain control circuits 4 and 5, and changes that gain. It is set as the location where control voltage VRT and VBT became respectively larger every morning and evening than amendment before since the gain became small according to the gain becoming large according to control voltage VRT becoming large, as for the gain control circuit 4, and control voltage VBT becoming large, as for the gain control circuit 5, the gain of the gain control circuit 4 of R channels was more large, it became smaller than the gain of the gain control circuit 5 of B channels, and white balance shifted to the red side a little. Conversely, from VR and VB, only a few becomes small and, as for the control voltage VRT and VBT in the daytime, is set as the location where, as for white balance, only a few shifted to the blue side.

[0014] Next, the actuation when using a video camera in foreign countries (for example, Paris) is explained. Shortly, a photography person sets up with the selection decision terminal 29 in search of Paris, carrying out count actuation of the counter 30 for location selection, and looking at a display output 33 with the selection directions terminal 28 of the location selection circuitry 27. Then, from the information storage section 31, in order to choose the information on Paris, i.e., the control signal for carrying out a time-of-day setup and the time difference information (criteria are - 8 hours in this case since it is Japan) on a timer circuit 34, and the amendment data table of Paris, a select signal is outputted to a correction value table. A setup of time of day makes the present time of day (Japan Standard Time) input into a timer circuit 34 from the total time-of-day circuit 20 with the control signal from the information storage section 31, is calculated for the time difference information from the information storage section 31 (for example,  $PM\ 6:30 - 8\ hours = AM\ 10:30$ ), and is generated from the total time-of-day circuit 20 as time information.

[0015] The correction value table 22 chooses the amendment data table of Paris with the select signal from time information and the information storage section 31 inputted from the total time-of-day circuit 20, and outputs the white balance setting location amendment data according to it. The amendment data is changed into the amendment signals CR and CB of an analog by D/A converters 23 and 24. These amendment signals CR and CB Since it is the case where LONG differs as a location, the level of every morning and evening as shown in drawing 4 (a) as well as Japan is high, and according to time of day, it changes so that level in the daytime may become low. (Although there is almost no time difference, since sunshine differs from sunset time amount, the location where LAT differs changes on the level of drawing 4 as shown in (b)). Subsequent processings are adders 25 and 26 like the above, and are these amendment signals

CR and CB. It adds to control voltage VR and VB (output of the division circuits 14 and 15), respectively, and they are these amendment signals CR and CB. The added control voltage VRT and VBT is inputted into the gain control circuits 4 and 5, and changes that gain. Since the gain becomes large according to control voltage VRT becoming large and the gain becomes small according to control voltage VBT becoming large, the gain control circuit 4 the gain control circuit 5 every morning and evening Control voltage VRT and VBT becomes larger than amendment before, respectively (however, time amount is short at the time of the location applicable to (b) of drawing 4 ). The gain of the gain control circuit 4 of R channels is more large, it becomes smaller than the gain of the gain control circuit 5 of B channels, and white balance is set as the location which shifted to the red side a little.

[0016] Conversely, the control voltage VRT and VBT in the daytime is VR and VB. Only a few becomes small (however, time amount is long at the time of the location applicable to the amendment data of drawing 4 (b)), and white balance is set as the location where only a few shifted to the blue side. Moreover, when using it on remarkably different photography conditions (the right wrong of the weather, indoor, etc.) from the data of the correction value table 22, the selection decision terminal 29 is switched, actuation of the location selection circuitry 27 is stopped, and it is made to carry out white balance adjustment only in the white balance equalization circuit 16. thus -- since amendment of the setting location of white balance is performed according to a location and time of day -- every country in the world -- the color tone of the image photoed in anywhere serves as an image of the color tone near visual sensation.

[0017] In the example 2. above-mentioned example, although data were set up according to the time of day of a day as amendment data of the correction value table 22, amendment data may be set up according to one year of season.

[0018]

[Effect of the Invention] Since it had a means to amend the white balance setting location of a white balance equalization circuit so that human being's visual sensation may be approached, according to this invention as mentioned above so that change of the color temperature of the natural light based on the location and time of day at the time of photography might be met, it is effective in the video camera which can be photoed in the color tone near human being's visual sensation also in traveling abroad being obtained.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the block circuit diagram showing the configuration of the white balance equipment by one example of this invention.

[Drawing 2] It is the block circuit diagram showing the configuration of the location selection circuitry by one example of this invention.

[Drawing 3] It is the block circuit diagram showing the configuration which made concrete the white balance equipment by one example of this invention.

[Drawing 4] It is drawing showing the change to the time of day of the amendment data of one example of this invention.

[Drawing 5] It is the block circuit diagram showing conventional white balance equipment.

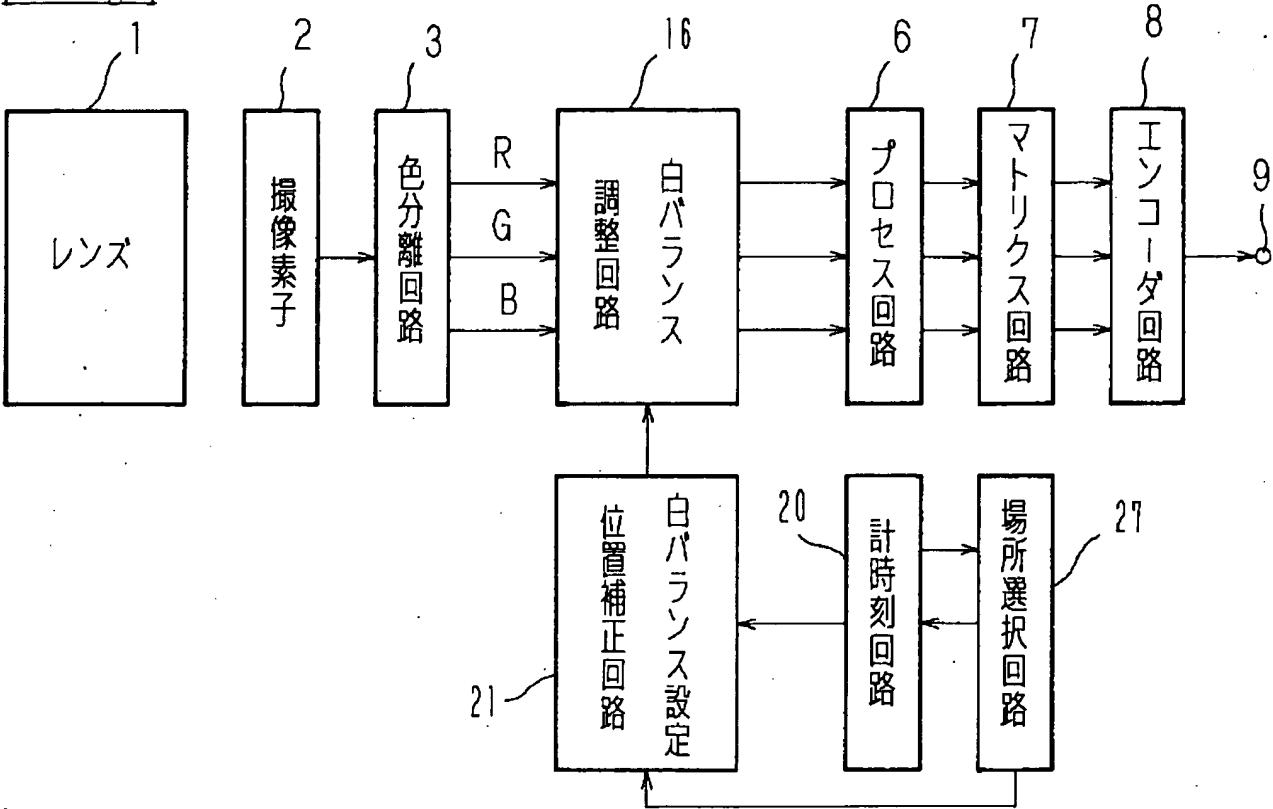
[Description of Notations]

- 16 White Balance Equalization Circuit
- 20 Total Time-of-Day Circuit
- 21 White Balance Setting Location Amendment Circuit
- 27 Location Selection Circuitry

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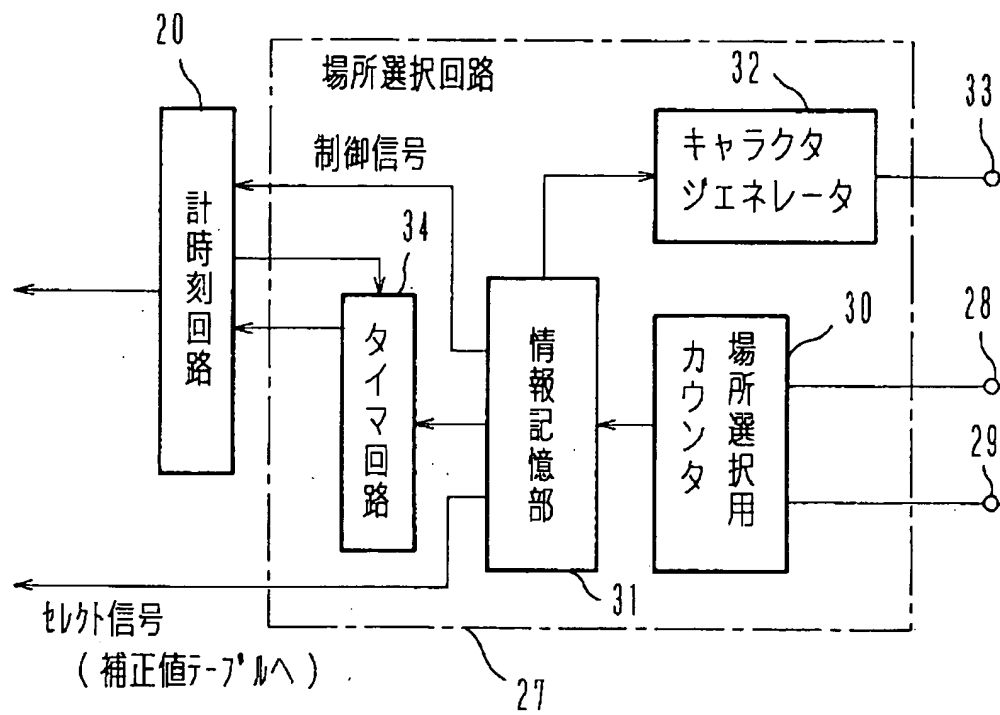
DRAWINGS

[Drawing 1]



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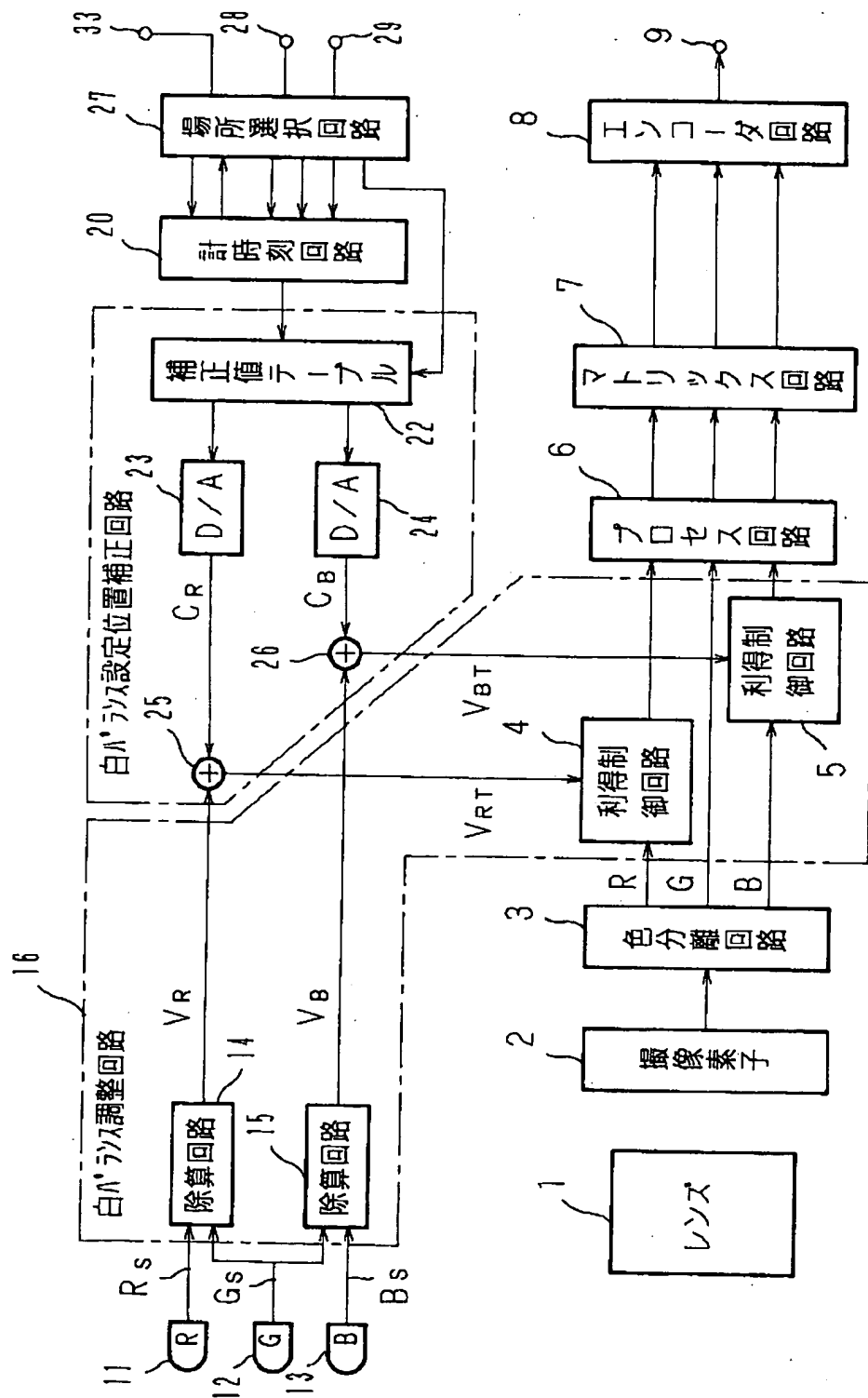
[Drawing 2]



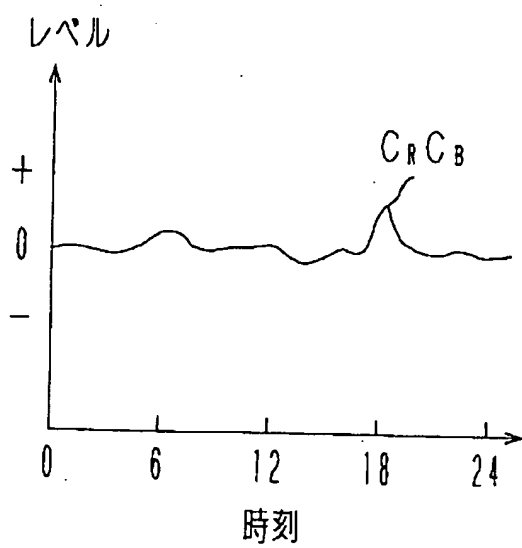
[Drawing 3]



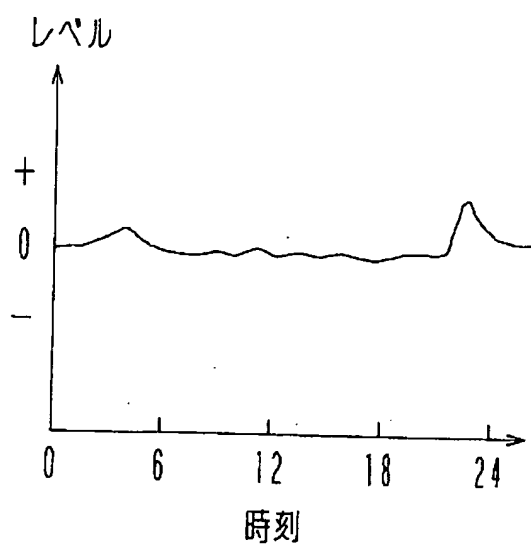
[Drawing 4]



( a )



( b )



[Drawing 5]

